

Appl. No. 10/675,049

Amdt. dated 5/25/06

Reply to Office action of February 16, 2006

REMARKS/ARGUMENTS

Reconsideration of the application is requested.

Claims 1-13 and 15-24 are now in the application. New withdrawn claims 23 and 24 have been added. No claims have been amended or canceled herein.

The purpose of this Supplemental Amendment is to submit additional claims as well as additional comments which have been provided by the inventor of the instant application.

U.S. Patent No. 5,484,484 to Yamaga et al. (hereinafter Yamaga), which was applied against the claims of the instant application in the above-identified Office Action, discloses a configuration of gas connections or supplies having a double-walled construction with all of the gas inlets being fitted at the bottom. Such a construction makes it necessary to traverse a longer distance until the precursors (reaction gases) reach the wafer. In the volume between the double walls, gas phase reactions occur, which generate particles. A further particle source is the double wall. Chemical reactions are initiated at the surface, which again degrade the precursors (reaction gases). The principle of flow return worsens the problem of particle generation. When the gases come from the outside to the inside, the particles are

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generated in the double shell and are transported directly to the wafer. If one changes the flow direction, the fresh gas comes first into the deposition chamber and then into the region of the double walls. Particles are generated there. They do not come directly into the deposition chamber, rather the largest part remains in the gas phase and during the subsequent flow return, they are blown directly into the deposition chamber and naturally onto the wafer.

The configuration of the gas inlets in the upper and lower sides of the process space according to the invention of the instant application as recited in claims 1-13 and 15-22 and disclosed in Fig. 1 does not allow the provision of an additional volume. Furthermore, a large surface of a double shell, which can generate particles, is not provided in the embodiment of claims 1-13 and 15-22 and Fig. 1 of instant application.

The following comments are also being made regarding the withdrawn method claims, since rejoinder of those claims is required by MPEP 821.04 if they contain all of the features of the allowed product claims.

Besides the arguments for patentability of the withdrawn method claims presented in the previous Amendment and besides

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the fact that claim 1 calls for "a process gas flowing", new claims 23 and 24 have been added herein to call for passing the same process gas through the process space before and after the step of changing the main flow direction.

Yamaga teaches the introduction of a first gas into the first gas supply pipe 4 for a CVD process and removal of that gas through a first gas exhaust pipe 5. The system having the pipes 4 and 5 is used for reduced-pressure CVD.

Yamaga also teaches the introduction of a second gas through a second gas supply pipe 6 for reduced-pressure CVD and removal of the second gas from a second gas exhaust pipe 7. The system having the pipes 6 and 7 is used for oxide processing (see column 5, lines 1-15 of Yamaga).

As is stated in the Abstract of Yamaga, SiH_2Cl_2 and NH_3 is made to flow from an inner side to an outer side of the inner tube by the action of a first gas supply pipe and first exhaust pipe provided in the thermal processing apparatus. Next, the temperature in the interior of the reaction tube is raised to, for example, 1000°C , a reaction gas comprising, for example, H_2O vapor and HCl is made to flow from the outer side to the inner side of the inner tube by the action of a second gas supply pipe and second exhaust pipe, and an SiO_2

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layer is formed by the oxidation of the surface of the Si_3N_4 layer formed on the surface of the wafer, under normal-pressure conditions.

Yamaga, therefore, clearly uses different gases in the systems 4,5 and 6,7.

There is also no hint or suggestion in Yamaga to introduce gases of the same composition, with the goal of increasing homogeneity, in the deposition chamber, as is recited in claims 1 and 23 of the instant application. Thus claims 1-12 and 21-24 are also believed to be patentable over Yamaga for these reasons as well.

In view of the foregoing and the arguments presented in the previous Amendment, it is clear that Yamaga does not show or suggest:

a process gas as recited in claim 1, or

passing the same process gas through the process space before and after the step of changing the main flow direction as recited in new claims 23 and 24, or

the process gas flowing along the main flow direction between the top and bottom sides of the process space as recited in claims 1 and 13, or

the process gas flow being unobstructed in the process space and the process space having no obstructions or guides therein for the process gas flow as recited in claims 18, 19 and 21; or

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the main flow direction of the process gas flow being unidirectional within the process space as recited in claims 20 and 22;

of the instant application.

It is accordingly believed to be clear that none of the references, whether taken alone or in any combination, either show or suggest the features of claims 1, 13 and 18-24.

Claims 1, 13 and 18-24 are, therefore, believed to be patentable over the art. The dependent claims are believed to be patentable as well because they all are ultimately dependent on claim 1 or 13.

In view of the foregoing, reconsideration and allowance of claims 1-13 and 15-24 are solicited.

Counsel's payment in the amount of \$100.00 for two additional dependent claims in excess of 20, is enclosed.

If an extension of time is required, petition for extension is herewith made. Any extension fee associated therewith should be charged to the Deposit Account of Lerner and Greenberg, P.A., No. 12-1099.

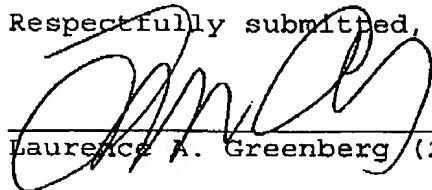
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Please charge any other fees that might be due with respect
to Sections 1.16 and 1.17 to the Deposit Account of Lerner
and Greenberg, P.A., No. 12-1099.

Respectfully submitted,


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LAG/bb

May 25, 2006

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